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Hsien

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(54) **RATCHET WRENCH AND LIGHTING CIRCUIT**

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(52) **U.S. Cl.** **362/119**; 81/60; 81/177.85
(58) **Field of Search** 362/119, 120, 362/398, 109, 202, 205, 267; 81/62, 177.2, 177.85

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,897,198	A	*	4/1999	Hsieh	362/119
6,006,632	A	*	12/1999	Hsieh	81/177.85
6,508,565	B2	*	1/2003	Wang	362/119
6,527,404	B2	*	3/2003	Wong	362/119

* cited by examiner

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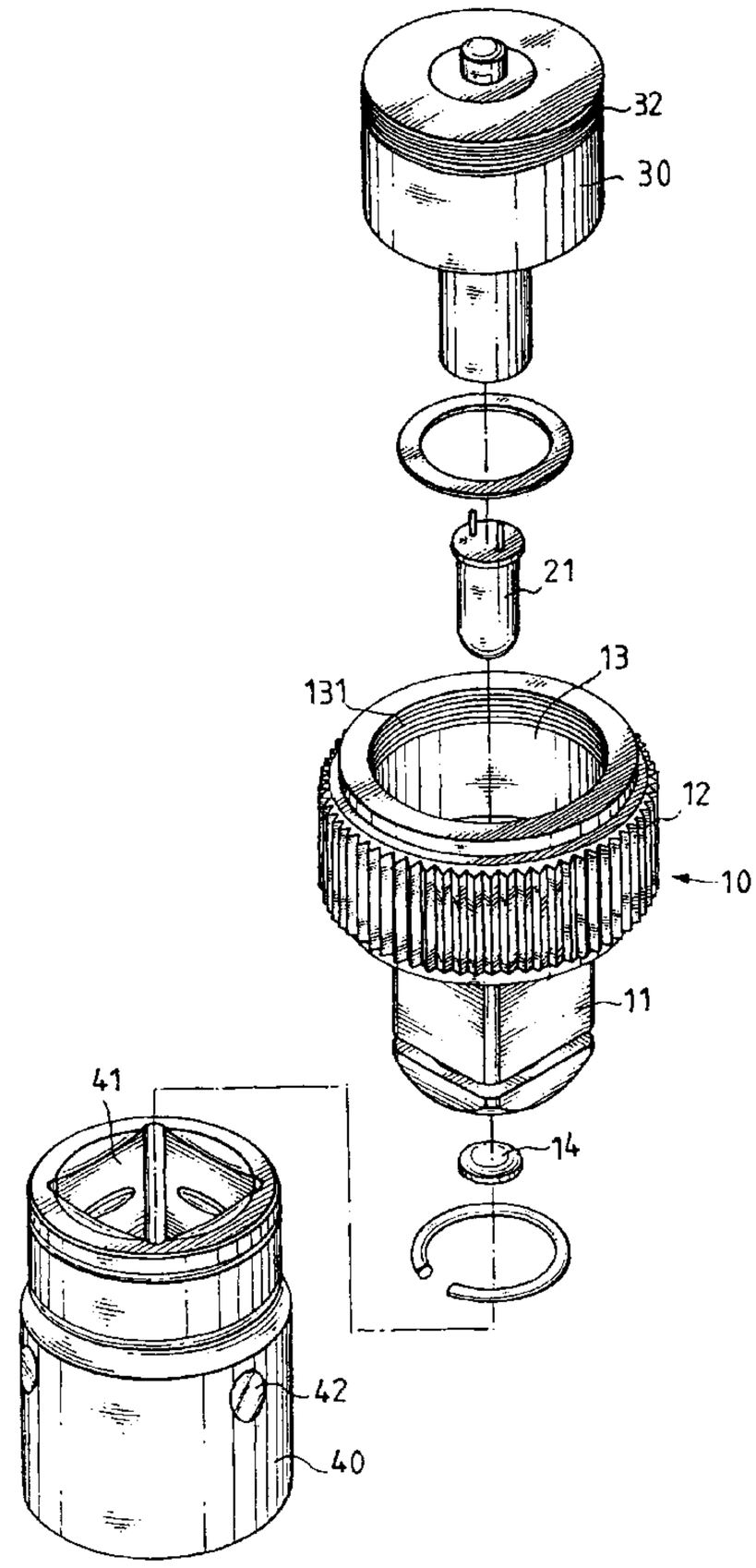
(57) **ABSTRACT**

A ratchet wrench and lighting circuit arrangement includes a ratchet wrench, the ratchet wrench having a hollow ratchet driving member mounted in a box at one end thereof, a holder shell fitted into the ratchet driving member and detachably secured thereto by a screw joint, and a lighting circuit assembly installed in the holder shell and controlled to emit light through a lens at a bottom side of the ratchet driving member.

5 Claims, 6 Drawing Sheets



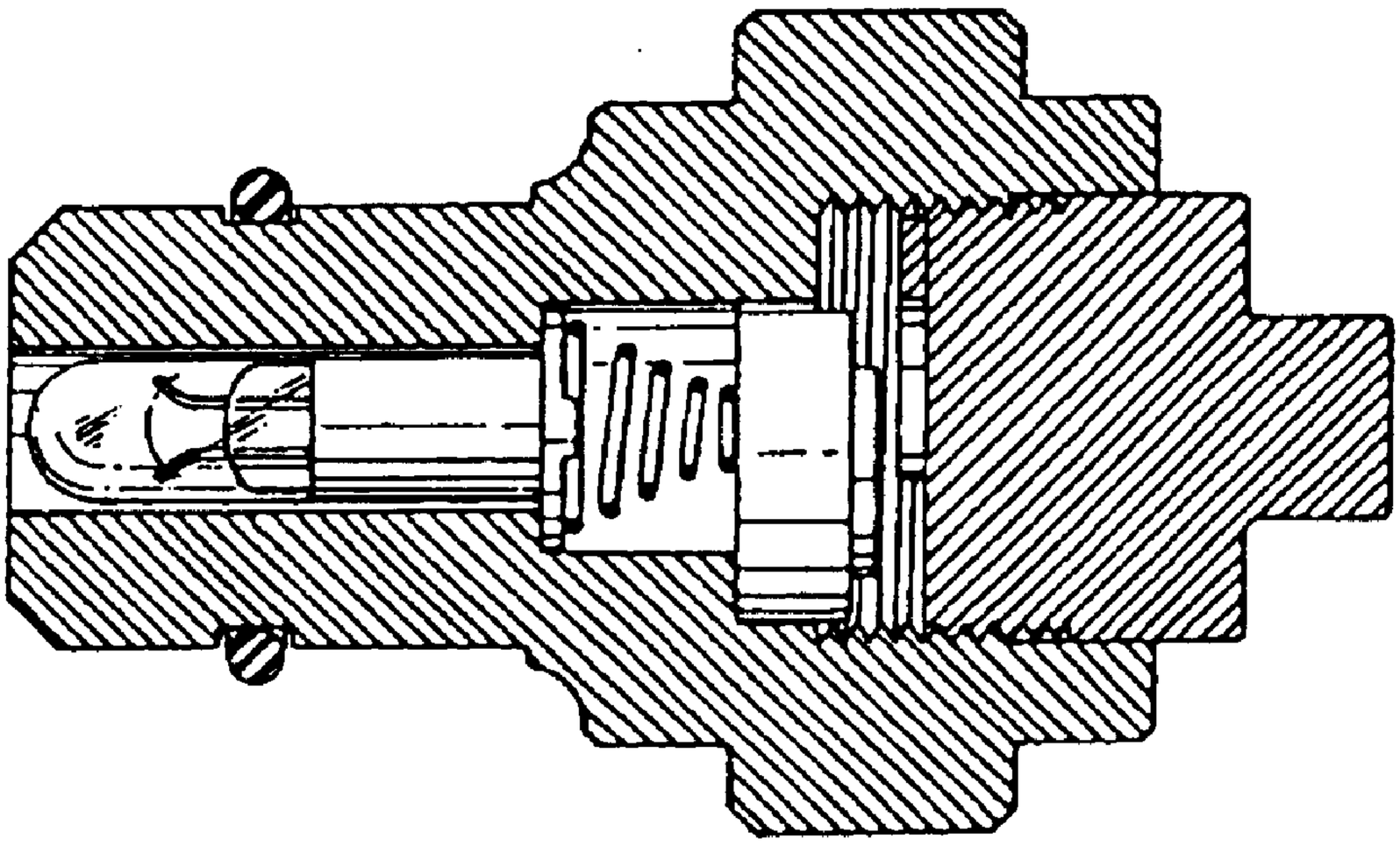


Fig . 1

PRIOR ART

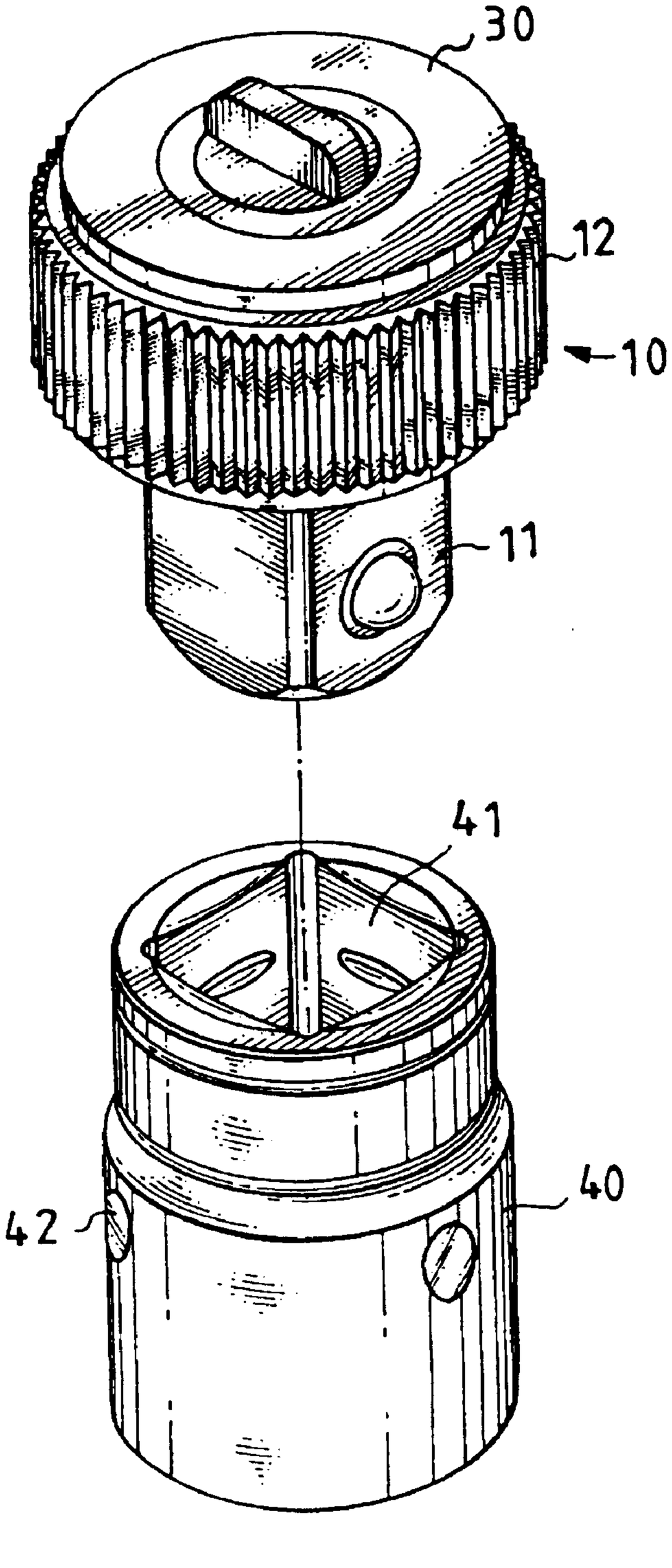


Fig . 2

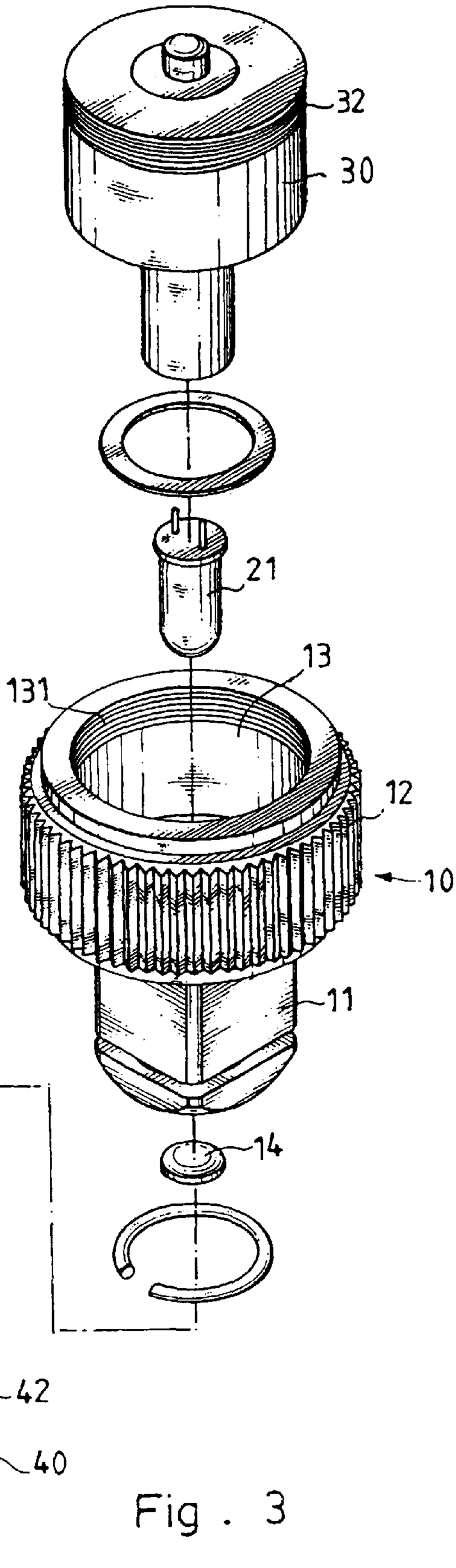


Fig . 3

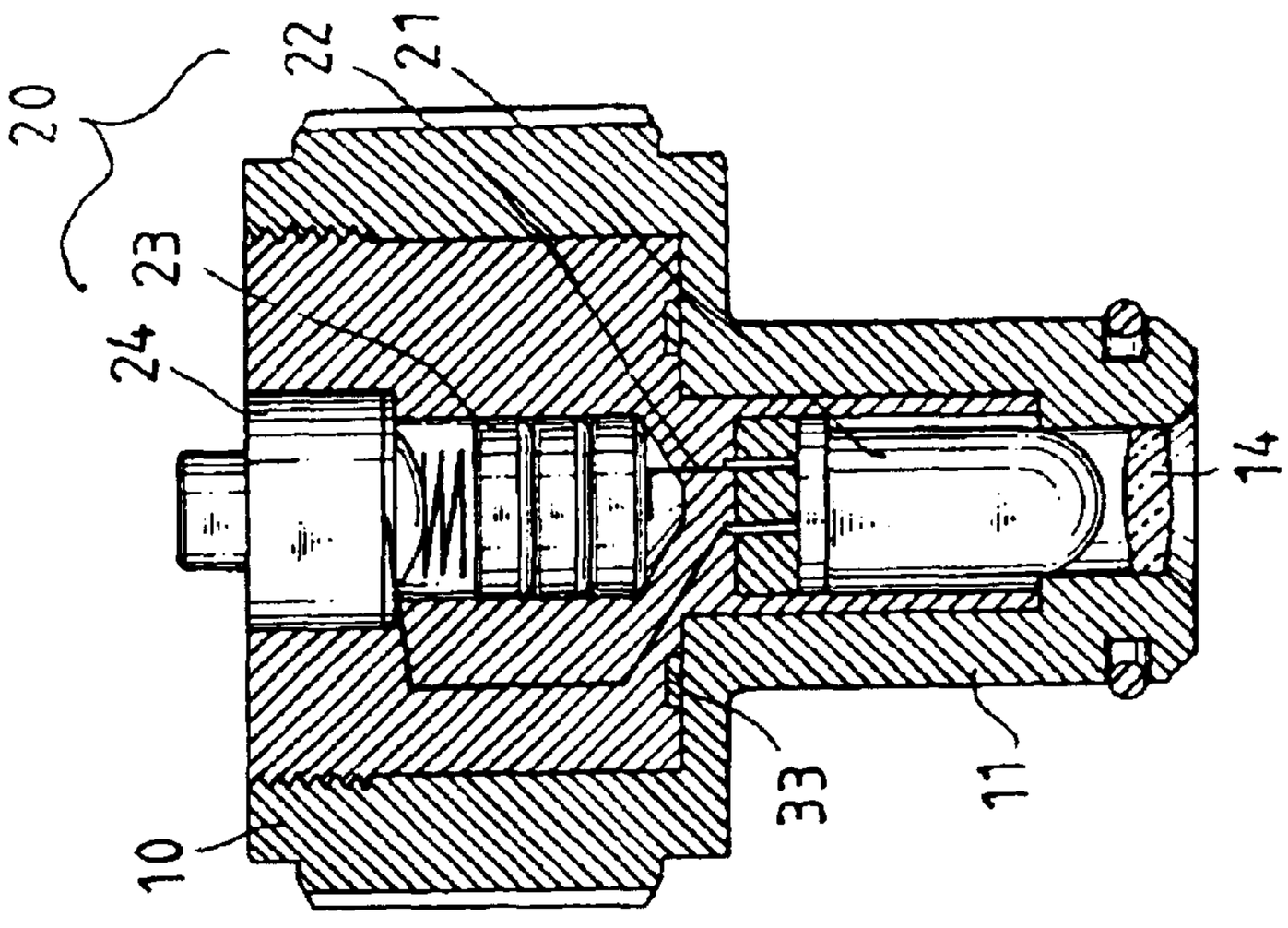


Fig. 4

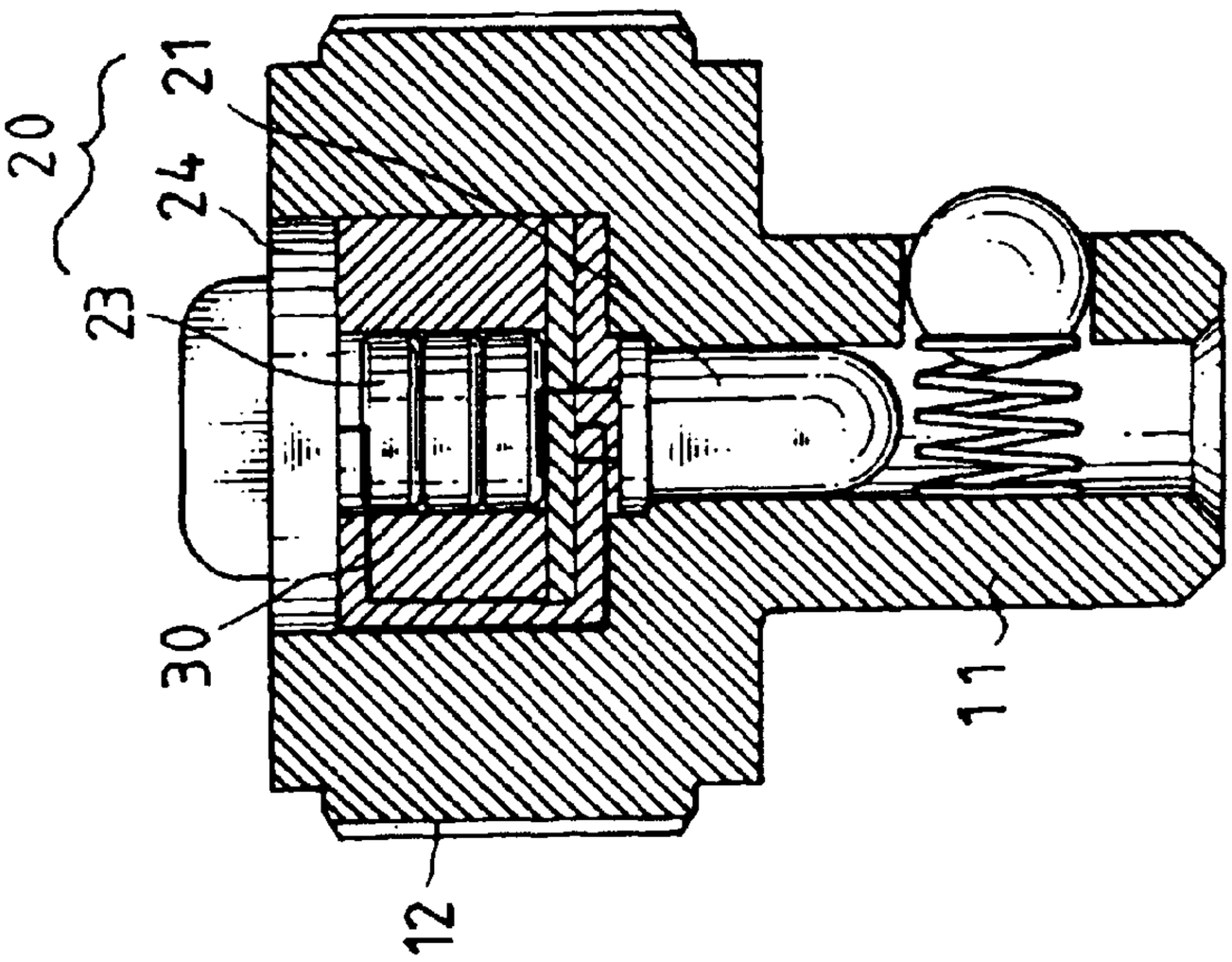


Fig. 5

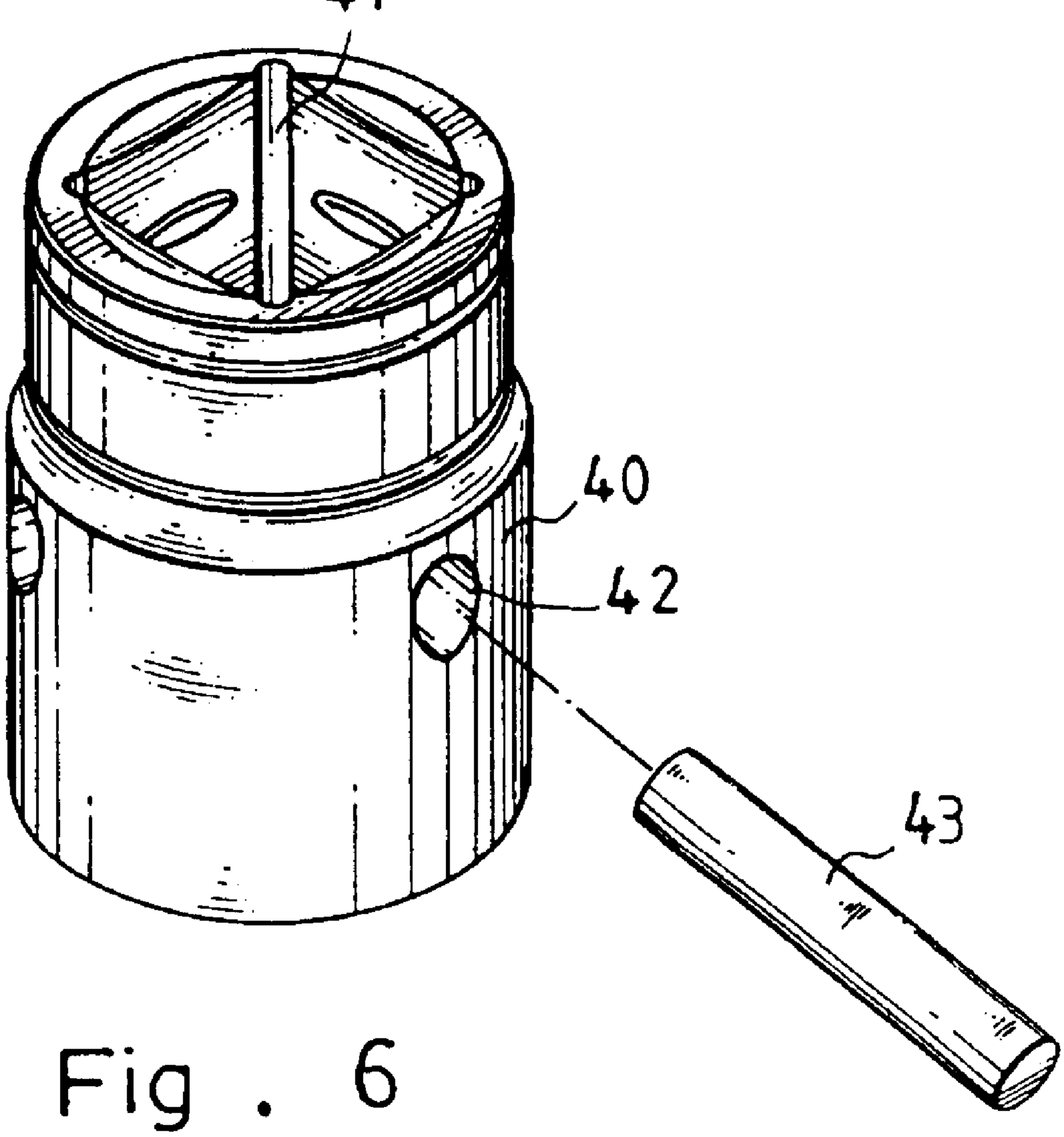


Fig . 6

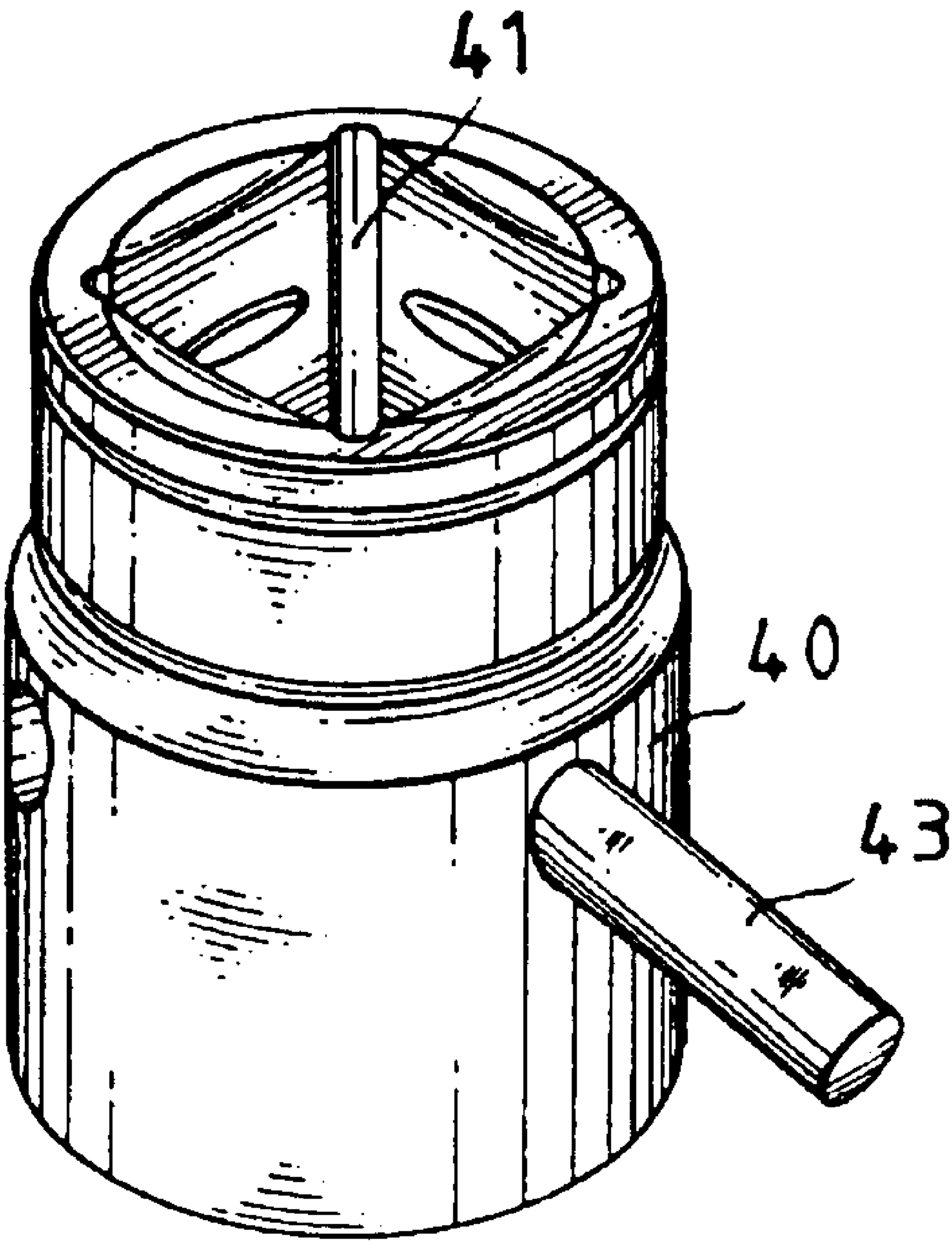


Fig . 7

RATCHET WRENCH AND LIGHTING CIRCUIT

BACKGROUND OF THE INVENTION

The present invention relates to wrenches, and more specifically, to a ratchet wrench and lighting circuit arrangement, which enables the user to replace the lamp bulb or battery of the lighting circuit assembly easily.

FIG. **1** shows a lighting circuit assembly installed in a ratchet driving member for ratchet wrench according to the prior art. As illustrated, the ratchet driving member has a stepped center through hole. The lighting circuit assembly is installed in the stepped center through hole of the ratchet driving member, comprised of a lamp socket holding a lamp bulb, a metal conical spring, a mercury battery, a metal contact plate, and a switch. This arrangement is not durable in use because the parts of the lighting circuit assembly tend to be forced out of position when operating the ratchet wrench. In case the lamp bulb is damaged or the battery power of the mercury battery is low, it is difficult to remove the lighting circuit assembly from the ratchet driving member for a replacement. Further, when the socket coupled to the shaft of the ratchet driving member and attached to the workpiece, the light passage is blocked.

SUMMARY OF THE INVENTION

The present invention has been accomplished to provide a ratchet wrench and lighting circuit arrangement, which eliminates the aforesaid drawbacks. It is one object of the present invention to provide a ratchet wrench and lighting circuit arrangement, which is easy to install. It is another object of the present invention to provide a ratchet wrench and lighting circuit arrangement, which enables the user to replace the lamp bulb or the battery conveniently. It is still another object of the present invention to provide a ratchet wrench and lighting circuit arrangement, which provides good illumination when mounted with the socket and attached to the workpiece. According to one aspect of the present invention, the ratchet wrench and lighting circuit arrangement comprises a ratchet wrench, the ratchet wrench having a hollow ratchet driving member mounted in a box at one end thereof and a socket detachably coupled to the ratchet driving member, a holder shell fitted into the ratchet driving member and detachably secured thereto by a screw joint, and a lighting circuit assembly installed in the holder shell and controlled to emit light through a lens at a bottom side of the ratchet driving member. According to another aspect of the present invention, the socket has transverse through holes through which light passes to the outside of the socket when the socket coupled to the ratchet driving member and attached to the workpiece.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a sectional view showing a lighting circuit assembly installed in a ratchet driving member for a ratchet wrench according to the prior art.

FIG. **2** is an elevational view of the present invention before the connection of the socket to the ratchet driving member.

FIG. **3** is an exploded view of the present invention.

FIG. **4** is a sectional view of the present invention.

FIG. **5** is a sectional view of an alternate form of the present invention.

FIG. **6** illustrates the outer appearance of the socket according to the present invention.

FIG. **7** shows the lever fastened to one transverse through hole of the socket according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. from **2** through **6**, a ratchet wrench and lighting circuit arrangement in accordance with the present invention is generally comprised of a ratchet driving member **10**, a lighting circuit assembly **20**, a holder shell **30**, and a socket **40**.

The ratchet driving member **10** is a hollow stepped member mounted in the box of a wrench body (not shown) having a ratchet wheel **12**, a polygonal shaft **11** axially extended from one side of the ratchet wheel **12**, a stepped through hole **13** axially extended through the ratchet wheel **12** and the polygonal shaft **11**, a lens **14** fixedly fastened to the polygonal shaft **11** at one end of the stepped through hole **13**, and an inner thread **131** in the ratchet wheel **12** around the other end of the stepped through hole **13**.

The lighting circuit assembly **20** is comprised of a lamp bulb **21**, a metal contact plate **22**, a mercury battery **23**, and a switch **24**.

The holder shell **30** fits the stepped through hole **13** of the ratchet driving member **10**, having an axially extended open chamber **31**, which holds the lighting circuit assembly **20**, and an outer thread **32** threaded into the inner thread **131** of the ratchet driving member **10**. Alternatively, a magnetic member **33** can be fixedly provided at a part of the holder shell **30**, so that the holder shell **30** is secured in position by magnetic attraction when inserted into the stepped through hole **13** of the ratchet driving member **10** (The ratchet driving member **10** is made of metallic material attractive to magnet).

The socket **40** has an axially extended polygonal coupling hole **41** coupled to the polygonal shaft **11** of the ratchet driving member **10**, and a plurality of transverse through holes **42** in communication with the axially extended polygonal coupling hole **41**.

The lighting circuit assembly **20** is installed in the axially extended open chamber **31** of the holder shell **30** before the assembling the ratchet wrench. When assembling the ratchet wrench, the holder shell **30** is directly fastened to the stepped through hole **13** of the ratchet driving member **10**. When the lamp bulb **21** is damaged, the holder shell **30** can easily be removed from the ratchet driving member **10** so that the user can replace the damaged lamp bulb **21**.

When switched on the switch **24**, light passes from the lamp bulb **21** through the lens **14** and then the transverse through holes **42** to the outside of the socket **40** to illuminate the working area around the workpiece. Further, the transverse through holes **42** may be respectively covered with a transparent or colored (acrylic) lens.

Referring to FIG. **7**, a lever **43** may be inserted into one transverse through hole **42** of the socket **40** for turning the socket **40** and the workpiece with the hand.

A prototype of ratchet wrench and lighting circuit arrangement has been constructed with the features of FIGS. **2~7**. The ratchet wrench and lighting circuit arrangement functions smoothly to provide all of the features discussed earlier.

Although a particular embodiment of the invention has been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.

What the invention claimed is:

1. A ratchet wrench and lighting circuit arrangement comprising a lighting circuit assembly, and a ratchet wrench holding said lighting circuit assembly, said ratchet wrench comprising a ratchet driving member, wherein said ratchet driving member comprises a stepped through hole, a holder shell fitted into said stepped through hole, and fastening means, which secures said bolder shell to said ratchet driving member, said holder shell having an axially extended open chamber, which holds said lighting circuit assembly, wherein said fastening means comprises a magnetic member fixedly mounted on said holder shell to attract said ratchet driving member.

2. The ratchet wrench and lighting circuit arrangement as claimed in claim **1** wherein said fastening means comprises an inner thread provided in the stepped through hole of said ratchet driving member, and an outer thread provided at said holder shell and threaded into said inner thread.

3. The ratchet wrench and lighting circuit arrangement as claimed in claim **1** wherein said ratchet driving member comprises a lens fastened to one end of said stepped through hole through which the light of said lighting circuit assembly passes to the outside of said ratchet driving member.

4. The ratchet wrench and lighting circuit arrangement as claimed in claim **1** further comprising a socket for coupling to said ratchet driving member to rotate a bolt or nut, said socket having transverse through holes through which the light passes from said lighting circuit assembly to the outside of said socket.

5. The ratchet wrench and lighting circuit arrangement as claimed in claim **4** further comprising a lever for insertion into one transverse through hole of said socket for turning said socket and the workpiece to which said socket is attached.

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